

REMARKS

Summary of Office Action

Claims 11-18 stand rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over Molsen et al. (U.S. Patent No. 6,122,024) in view of Sakai et al. (U.S. Patent No. 6,222,603) and further in view of Kubota et al. (U.S. Patent No. 6,429,914).

Claim 22 stands rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over Molsen et al. in view of Sakai et al., Kubota et al., and further in view of Hiji et al. (U.S. Patent No. 5,872,609).

Claim 11 is objected to because of the informalities.

Summary of Amendment

Claim 11 has been amended referring to figures 6A and 6B and claim 16 has been canceled. No new matter has been added. Hence, claims 11-15, 17, 18 and 22 are pending for consideration.

All Claims Comply under objections

Claim 11 is objected to because of the informalities. In response, Applicants have amended claim 11. Accordingly, Applicant respectfully requests withdrawal this objection.

All Claims Comply With § 103

Claims 11-15, 17 and 18 stand rejected under 35 U.S.C § 103(a) as allegedly being

unpatentable over Molsen et al. in view of Sakai et al. and further in view of Kubota et al. Claim 22 stands rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over Molsen et al. in view of Sakai et al., Kubota et al., and further in view of Hiji et al. Applicant respectfully traverses.

As amended, independent claim 11 recites, in part, “wherein the photo-reactant material and the liquid crystal material form a polymer network without distinction of layer, ... wherein, when a voltage is applied across the two electrodes, the liquid crystal and photo-reactant material are arranged by the applied electric field in the horizontal direction, and wherein, when the voltage is not applied across the two electrodes, the polymer network increases a restoring force to restore the liquid crystal.” Support for this feature is illustrated at least in figures 6A and 6B.

Molsen et al. fails to teach or suggest such a feature. In particular, Molsen et al. discloses that nematic liquid crystals 8 and helical polymer network 9 are distinguished and formed to a plurality of layer, wherein the helical polymer network 9 causes the nematic liquid crystals 8 to adopt a helical twist in the absence of an applied field, and further wherein the twisted liquid crystals 8 are arranged by the applied electric field, between upper and lower electrodes 2 and 5, in a vertical direction. However, Molsen et al. does not disclose that the photo-reactant material and the liquid crystal material form a polymer network without distinction of layer, as claimed. In the Office Action, the Examiner alleges that the limitation of “mixed without distinction of layer” recites a one-step process which does not further limit the structure of the device claims. Accordingly, Applicant has amended claim 11 to clarify the physical distinctions over Molsen et al. Also, Molsen et al. does not disclose that, when a voltage is applied across the two electrodes,

the liquid crystal and photo-reactant material are arranged by the applied electric field in the horizontal direction and when no voltage is applied across the two electrodes, the photo-reactant material and the liquid crystal interact and are aligned in a first direction and, when a voltage is applied across the two electrodes, the liquid crystal are arranged by the applied electric field in the horizontal direction, as claimed.

Sakai et al. does not and cannot cure at least this deficiency.

Kubota et al. discloses that a poly dispersion 12 comprising a liquid crystal 18 and a liquid crystalline polymer 17 can be used in IPS type LCD, wherein, when a voltage is applied between electrodes 7 and 8, the polymer 17 increases a difference in the refractive index between the liquid crystal 18 and a scattering state is obtained. Kubota et al. discloses that the liquid crystal 18 rotates according to a horizontal electric field while liquid crystalline polymer 17 is fixed without moving as shown in figure 6. However, Kubota et al. fails to teach or suggest that the liquid crystal and photo-reactant material are arranged in the horizontal direction when a voltage is applied across the two electrodes and that the polymer network increases a restoring force to restore the liquid crystal when the voltage is not applied across the two electrodes as claimed. In the claimed invention, the liquid crystal and photo-reactant material are arranged in the same direction by the applied voltage, thereby obtaining an effect of good black. However, Kubota et al. discloses that the direction of the liquid crystal 18, rotated by the applied voltage, is difference from the direction of the polymer 17, thereby obtaining the scattering state. Hence, the effect of Kubota et al. is difference from the effect of the claimed invention. Also, Applicant respectfully submits that it is no motivation to combine Molsen et al., using the liquid crystals 8

twisted by the helical polymer network 9 and driven by the vertical electric field, and Kubota et al., using the poly dispersion 12 comprising a liquid crystal 18, driven by the horizontal electric field, and a liquid crystalline polymer 17.

Therefore, Molsen et al. and Sakai et al., whether taken individually or in combination, fail to teach all the features of independent claim 11 and claims 12-18, depend from claim 11. Also, Kubota et al., fails to teach all the features of independent claim 11 and claims 12-18, depend from claim 11.

Claim 22 also depends from independent claim 11, thereby incorporating all the features of claim 11. Hiji et al. discloses a light control layer 50 laminated a non-sensitive layer 51 and a sensitive layer 52 alternately in the vertical direction and containing an oriented liquid crystal as shown in Fig 1A to 2B. When voltage is applied between electrode 43 and 44, the liquid crystal molecules in the non-sensitive layer 51, which is formed in high crosslinking density area, which does not respond to the voltage and only the liquid crystal molecules in the sensitive layer 52, which is formed in low crosslinking density area, easily respond to the voltage and changes into the other direction. This causes a difference in refractive index between the non-sensitive layer 51 and the sensitive layer 52. However, Hiji et al. does not disclose that the photo-reactant material and the liquid crystal material form a polymer network without distinction of layer; that, when a voltage is applied across the two electrodes, the liquid crystal and photo-reactant material are arranged by the applied electric field in the horizontal direction; and that, when the voltage is not applied across the two electrodes, the polymer network increases a restoring force to restore the liquid crystal, as claimed. Also, Applicant respectfully submits that it is no motivation to

combine Hiji et al., using a light control layer 50 laminated a non-sensitive layer 51 and a sensitive layer 52 alternately in the vertical direction and driven by the vertical electric field, and Kubota et al., using the poly dispersion 12 comprising a liquid crystal 18, driven by the horizontal electric field, and a liquid crystalline polymer 17. Therefore, Molsen et al., Sakai et al. and Hiji et al., whether taken individually or in combination, fail to teach all the features of claim 22 for at least the reason discussed above. Also, Kubota et al., fails to teach all the features of claim 22, depend from claim 11, for at least the reason discussed above.

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CONCLUSION

In view of the foregoing, reconsideration and timely allowance of the pending claims are respectfully requested. Should the Examiner feel that there are any issues outstanding after consideration of the response, the Examiner is invited to contact the Applicant's undersigned representative to expedite prosecution.

If there are any other fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

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By: 

Xiaobin You
Reg. No. 62,510

Customer No.: 009626
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
Telephone: 202.739.3000
Facsimile: 202.739.3001